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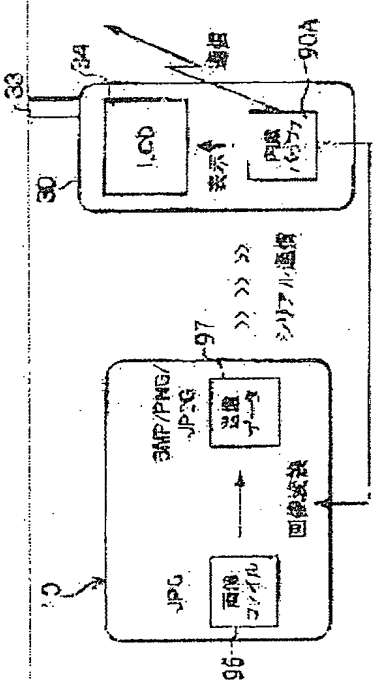
(54) DIGITAL CAMERA AND DATA TRANSFER METHOD

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a digital camera and a data transfer method, in a system even where an image photographed by the digital camera is transferred to a mobile phone or other external device and displayed therein, image quality is maintained to the utmost and data are transferred surely even when data of a large image size in excess of a built-in memory capacity of the external device are designated as a transfer object.
SOLUTION: The digital camera 10 and the mobile phone 30 are connected to conduct negotiation by communication between them, and the digital camera 10 acquires information with respect to a capacity of a built-in buffer 90A of the mobile phone 30. The digital camera 10 applies image conversion to the image data which are transfer objects by revising a Huffman table and a quantization table so as to reduce the file size, thereby limiting the data quantity so as to be within the capacity of the built-in buffer size 90A. The transmission data 97, produced in this way, are transferred to the mobile phone 30 and stored in the built-in buffer 90A.



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* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
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CLAIMS

[Claim(s)]

[Claim 1] It is the digital camera which can be transmitted to the external instrument of a portable telephone and others about the data of the photoed image. This digital camera An information acquisition means to acquire at least one information from said external instrument by communication link among the information about the output engine performance of the image output means formed in the information about usable capacity and said external instrument of the memory built in said external instrument, A file translation means to change the image file for a transfer into the file of the amount of data which was suitable for the usable capacity of said memory, and the output engine performance of said image output means based on said acquired information, and to generate the data for transmission, The digital camera characterized by having a data transfer means to send out said generated data for transmission to said external instrument side.

[Claim 2] Said information acquisition means is a digital camera according to claim 1 characterized by being constituted by the control means which controls the means of communications and the contents of a communication link which are shared as said data transfer means.

[Claim 3] Said file translation means is a digital camera according to claim 1 or 2 characterized by reducing the amount of data by performing at least one of modification (resizing) of image size, and modification of a data compression rate.

[Claim 4] It is the digital camera according to claim 1 or 2 characterized by said file translation means extracting some frames in the animation file concerned as data for transmission when the image file for [said] a transfer is an animation file.

[Claim 5] It is the data transfer approach of transmitting the data of the image which connected the external instrument and digital camera of a portable telephone and others possible [a communication link], and was photoed with said digital camera to said external instrument side. This approach The process which provides a digital camera side with at least one information from said external instrument by communication link among the information about the output engine performance of the image output means formed in the information about usable capacity and said external instrument of the memory built in said external instrument, The image file for a transfer is changed into the file of the amount of data which was suitable for the usable capacity of said memory, and the output engine performance of said image output means based on the acquired information concerned with said digital camera which acquired said information. The data transfer approach characterized by including the process which generates the data for transmission, and the process which sends out said generated data for transmission to said external instrument side.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to a digital camera and the data transfer approach, and relates to the technique of connecting with electronic equipment, such as a portable telephone, and transmitting a photography image especially.
[0002]
[Description of the Prior Art] In order to have transmitted conventionally the image photoed with the digital camera far away, communication facility needed to be given to the digital camera itself as shown in JP,8-237526,A. However, if it has a built-in buffer in the newest portable telephone and data are inputted into the built-in buffer, data transfer is possible by the transmitting function of a portable telephone.
[0003] BMP since display area is small from an existing model when it is going to display far away the image photoed with the digital camera using such a portable telephone at the display of a transfer or a portable telephone Transfer image data is created / transmitted, having used file format of an incompressible condition, such as a format, as in use.
[0004]
[Problem(s) to be Solved by the Invention] When the image photoed with the digital camera was transmitted and displayed on a portable telephone, in the main present file sizes (pixel number: 120x96), image quality was not asked from the deficiency in performance of that size is small from the first or a display. However, it is thought that enlargement of the display of a portable telephone and high performance-ization will progress from now on, a JPEG (Joint Photographic Expert Group) file etc. becomes in use, and the image format to treat is also expected that image quality is thought as important.
[0005] Since the availability of the cache buffer which stores data in the portable telephone temporarily at this time is changed at any time by the operating condition / model / busy condition of a portable telephone, it has the problem that a file size cannot be uniquely determined only by the number data of pixels, and file format.
[0006] When it is going to transmit the image exceeding the capacity of a built-in buffer of the amount of data, by the conventional method, a transfer error occurs and the contents of an image may be unable to be checked in the destination.
[0007] This invention was made in view of such a situation, also when transmitting the data of the big image size assumed from now on, it can hold image quality as much as possible, it can surely perform data transfer, and aims at offering the digital camera and the data transfer approach of checking the contents of an image in the device of the destination.
[0008]
[Means for Solving the Problem] This invention is the digital camera which can be transmitted to the external instrument of a portable telephone and others about the data of the photoed image.

in order to attain said purpose. This digital camera An information acquisition means to acquire at least one information from said external instrument by communication link among the information about the output engine performance of the image output means formed in the information about usable capacity and said external instrument of the memory built in said external instrument, A file translation means to change the image file for a transfer into the file of the amount of data which was suitable for the usable capacity of said memory, and the output engine performance of said image output means based on said acquired information, and to generate the data for transmission, It is characterized by having a data transfer means to send out said generated data for transmission to said external instrument side.

[0009] According to this invention, the electronic image file of a photographic subject image is generated by taking a photograph with a digital camera. By connecting external instruments, such as a portable telephone, with this digital camera, the negotiation by communication link is performed among both, and a digital camera acquires at least one information among the information about the usable capacity of the internal memory by the side of an external instrument, and the information about the output engine performance of an image output means. And based on this information, it carries out regulating automatically of the amount of data of the image for a transfer according to an external instrument side, and transmits to an external instrument side. Thereby, the quality of the image file for a transfer can be held as much as possible, and the contents of an image can be sent to an external instrument side.

[0010] Not only a wired system but radio system is sufficient as the communication mode of a digital camera and an external instrument. As an image output means of an external instrument, there are print means, such as image display means, such as a liquid crystal display, and a printer, etc.

[0011] The digital camera is equipped with an image pick-up means to change an optical image into an electrical signal, a signal-processing means to change into a digital signal the picture signal outputted from this image pick-up means, and to perform necessary processing, a compression means to compress data, and a record means to record the generated electronic image file on a record medium if this invention is caused like 1 voice. Moreover, said information acquisition means is constituted by the control means which controls the means of communications and the contents of a communication link which are shared as said data transfer means.

[0012] According to other modes of this invention, said file translation means is characterized by reducing the amount of data by performing at least one of modification (resizing) of image size, and modification of a data compression rate.

[0013] According to the mode of further others of this invention, when the image file for [said] a transfer is an animation file, said file translation means is characterized by extracting some frames in the animation file concerned as data for transmission.

[0014] For example, by thinning out the frame in an animation equally at a fixed rate, a frame number may be reduced, fixed time amount is extracted from a head, or the frame which carries out the automatic judging of the existence of voice record, and does not have voice record about an animation with voice is deleted, and there may also be infanticide (unequal infanticide) of extracting only a part with voice record.

[0015] In order to attain said purpose, the data transfer approach concerning this invention It is the data transfer approach of transmitting the data of the image which connected the external instrument and digital camera of a portable telephone and others possible [a communication link], and was photoed with said digital camera to said external instrument side. This approach The process which provides a digital camera side with at least one information from said external instrument by communication link among the information about the output engine performance of the image output means formed in the information about usable capacity and said external instrument of the memory built in said external instrument. The image file for a transfer is changed into the file of the amount of data which was suitable for the usable capacity of said memory, and the output engine performance of said image output means based on the acquired information concerned with said digital camera which acquired said information. It is characterized by including the process which generates the data for transmission, and the

process which sends out said generated data for transmission to said external instrument side.
[0016]
[Embodiment of the Invention] The gestalt of desirable operation of the digital camera applied to this invention according to an accompanying drawing below and the data transfer approach is explained.
[0017] Drawing 1 is the outline block diagram having shown the connection relation between a digital camera and a portable telephone concerning the operation gestalt of this invention. A digital camera 10 has a shutter release 12 on the top face of a body, and photography is performed according to depression actuation of a shutter release 12. The image of the photoed photographic subject is changed into electronic image data, and is recorded on an archive medium (un-[in drawing 1] illustrating and drawing 2 are indicated as a sign 66) as an image file.

[0018] As shown in drawing 1 , the mode circuit changing switch 13, the liquid crystal display monitor (LCD) 14, the cross-joint carbon button 15, the menu / the O.K. carbon button 16, and Cancel button 17 are formed in the camera tooth back. A mode circuit changing switch 13 consists of slide type switches which served as an electric power switch, and is switchable in three positions of the "OFF location" (central halt location) used as a power source OFF, the "photography ON location" (it is the right-hand-side halt location on drawing 1) which serve as a power source ON in still picture photography mode, and the "playback ON location" (it is the left-hand-side halt location on drawing 1) which serve as a power source ON by the playback mode. The mode circuit changing switch 13 may be constituted from a dial type switch, may be replaced with the mode circuit changing switch 13 used also [electric power switch], and may prepare an electric power switch separately.
[0019] A liquid crystal display monitor 14 can display the playback image read from the preview drawing and archive medium 66 of the photoed image while being able to use it as an electronic finder for a field angle check at the time of photography. Moreover, information, such as the menu for performing various setup, actuation guidance, a display of the number of coma (about an animation, it is the time amount which can be photoed) which can be photoed, or a playback coma number, existence of stroboscope luminescence, a macro mode display, a record image quality (compressibility) display, and a pixel numeral, is also displayed on a liquid crystal display monitor 14.
[0020] The cross-joint carbon button 15 is the multifunctional control unit which can input directions of the four directions of the right-and-left upper and lower sides, a left key and a right key function as 1 coma backward-feed carbon button and a 1 coma passing <a thing> on carbon button at the time of a playback mode, respectively, and an upper key and a bottom key are used as a zoom key for scale-factor adjustment in a playback zoom function or the electronic zoom function at the time of photography. Moreover, the cross-joint carbon button 15 chooses a desired item from the menu screen displayed by the depression of a menu / the O.K. carbon button 16, or functions as a manual operation button which directs the contents of selection of the various setting items in each menu. When making a menu / the O.K. carbon button 16 change from the usual screen in each mode to a menu screen, it is used at the time of decision of the contents of selection, and activation (check) directions of processing etc. Cancel button 17 is used when returning to the actuation condition in front of [of the item chosen from the menu] cancellation (cancellation) or one.
[0021] The connector area 18 for obtaining electrical installation with a portable telephone 30 is formed in the side face of a body of a digital camera 10. It connects with a digital camera 10, a portable telephone 30, and mutual possible [a communication link] by inserting the plug 41 of a cable 40 in this connector area 18, and inserting the plug 42 of another side in the connector area 32 by the side of a portable telephone 30.
[0022] The portable telephone 30 is equipped with an antenna 33, a liquid crystal display (LCD) 34, the cross-joint carbon button 35, the manual operation button 36, the speaker 37, and the ear piece 38.
[0023] Drawing 2 is the block diagram showing the internal configuration of the digital camera 10 shown in drawing 1 , and a portable telephone 30. After the quantity of light is adjusted according

to diaphragm 52, incidence of the light which passed the taking lens 51 of a digital camera 10 is carried out to CCD series (henceforth CCD) 53. It may replace with CCD53 and other image pickup devices, such as CMOS image sensors, may be used. Much photosensors are arranged superficially in the light-receiving side of CCD53, and the photographic subject image by which image formation was carried out to the light-receiving side of CCD53 through the taking lens 51 is changed into the signal charge of the amount according to the amount of incident light by each photosensor. In addition, CCD53 has the so-called electronic shutter function which controls the charge storage time (shutter speed) of each photosensor by timing of a shutter gate pulse.

[0024] The signal charge accumulated in each photosensor is read one by one as a voltage signal (picture signal) according to a signal charge based on the pulse given from a driver circuit 54. The picture signal outputted from CCD53 is sent to the analog processing section 55. In the analog processing section 55, color separation processing of the analog processing section 55 is carried out in a correlation duplex sampling (CDS) processing list at each chrominance signal of R, G, and B including a sampling hold circuit, a color separation circuit, a gain equalization circuit, etc., and adjustment (PURIHOWAITO balance processing) of the signal level of each chrominance signal is performed.

[0025] After the picture signal outputted from the analog processing section 55 is changed into a digital signal by A/D converter 56, it is sent to the signal-processing section 57. The timing generator (TG) 58 has given the timing signal to a driver circuit 54, the analog processing section 55, and A/D converter 56 according to the command of arithmetic and program control (CPU) 60, and the synchronization of each circuit is taken by this timing signal.

[0026] The signal-processing section 57 consists of digital signal processors (DSP) including picture signal processing circuits, such as brightness and a color-difference-signal generation circuit, a gamma correction circuit, a sharpness amendment circuit, and a white balance amendment circuit, and processes a picture signal according to the command from CPU60. The picture signal inputted into the signal-processing section 57 is stored in RAM61 after predetermined processing of a gamma correction etc. is performed, while being changed into the luminance signal (Y signal) and the color-difference signal (Cr and Cb signal).

[0027] When carrying out the display output of the photography image, the brightness and color-difference signal (it is written as YC signal) stored in RAM61 are sent to the LCD controller 63 through a bus 62. After YC signal sent to the LCD controller 63 is changed into the signal (for example, color compound video signal of NTSC system) of the predetermined method for a display, it is outputted to a liquid crystal display monitor 14. In this way, the contents of an image of the image data concerned are displayed on the screen of a liquid crystal display monitor 14.

[0028] The image inputted through CCD53 is displayed on real time by the liquid crystal display monitor 14 by rewriting the image data in RAM61 periodically by the picture signal outputted from CCD53, and supplying the video signal generated from the image data to a liquid crystal display monitor 14. A photography person can check a photography field angle with the image (through drawing) projected on a liquid crystal display monitor 14.

[0029] Photography mode is chosen with the mode circuit changing switch 13 explained by drawing 1 , and if a shutter release 12 is pushed, a photography initiation directions (release ON) signal will be emitted. CPU60 shown in drawing 2 starts incorporation (exposure and data read-out) of the image data for record following acceptance of this photography indication signal. After the data of a photography image pass through necessary processing in the signal-processing section 57, they are stored in RAM61. Moreover, CPU60 sends a command to the compression elongation circuit 64, and, thereby, the compression elongation circuit 64 compresses the image data on RAM61 according to the predetermined format of JPEG and others.

[0030] If the example of a JPEG method is explained, after a DC to AC converter, a quantization table, a Huffman coding table, etc. are contained, a subject-copy image is divided per predetermined pixel (for example, pixel block of 8x8) and a discrete cosine transform, quantization, and entropy code modulation are performed for every pixel unit, it will be outputted to the compression elongation circuit 64 as compressed data.

[0031] The compressed image data is recorded on an archive medium 66 through the media interface 65. Various media, such as SmartMedia (Solid-StateFloppy Disk Card), a PC card, CompactFlash (trademark), a magnetic disk, an optical disk, a magneto-optic disk, and a memory stick, can be used for an archive medium 66. The signal-processing means and interface according to the medium used are applied. Different species and an archive medium of the same kind may not be asked, but you may make it the configuration which can equip with two or more media. Moreover, a means to save data may be the record medium (internal memory) built not only in removable media but in the digital camera 10.

[0032] If a playback mode is chosen with the mode circuit changing switch 13 (refer to drawing 1), the last file (the newest file recorded at the end) currently recorded on the archive medium 66 shown in drawing 2 will be read. Elongation processing is carried out by the compression elongation circuit 64, and the data of the image file concerned are outputted to a liquid crystal display monitor 14 through the LCD controller 63. By operating the right key or left key of the cross-joint carbon button 15 at the time of this frame playback, coma delivery (file delivery) can be carried out to the forward direction or hard flow, and the image for playback can be changed.

[0033] CPU60 is the control section of a digital camera 10. CPU60 -- a control unit 67 -- actuation of a corresponding circuit is controlled based on the input signal accepted clitteringly, and photography motion control, the display control of a liquid crystal display monitor 14, etc. are performed. In addition, a control unit 67 is the block including the actuation means of the shutter release 12 shown in drawing 1, the mode circuit changing switch 13, and cross-joint carbon button 15 grade. The shutter release 12 is divided into two steps with the location to push in, if S1 with the shallow location to push in is pushed, automatic focus doubling (AF) and automatic exposure control (AE) will be performed, and if S2 with the deep location further pushed in from S1 is pushed, photography actuation for record (exposure, read-out) will be performed.

[0034] CPU60 performs various operations, such as a focal evaluation operation and AE operation, based on the image data inputted through CCD53, and it controls the charge storage time of CCD53 while controlling the lens mechanical component 68 based on the result of an operation, and moving a taking lens 51 to a focus location, and it controls and extracts the iris mechanical component 69 and sets 52 as a proper diaphragm value.

[0035] Various data required for the program and control which CPU60 processes etc. are stored in ROM70, and RAM61 has the working-level month field where CPU60 besides an image-processing field performs various kinds of data processing etc. Moreover, the digital camera 10 has the communication link interface 71 for delivering information by two-way communication between the external instruments of portable telephone 30 and others. CPU60 performs communications control (data transfer control is included) with the external instrument connected through the communication link interface 71.

[0036] On the other hand, also in the portable telephone 30, it has the communication link interface 81 for performing the communication link with the external instrument of digital camera 10 and others, and CPU82 as a control section. The communication link interfaces 71 and 81 are equivalent to the connector areas 18 and 32 shown by drawing 1, respectively. Various kinds of interfaces, such as serial interface, a parallel interface, etc. of a serial port, USB and IrDA, and IEEE1394 and others, are applicable to the communication link interfaces 71 and 81. Not only a wired system but Bluetooth using cable 40 grade You may be radio system [like].

[0037] A microphone 83 and a loudspeaker 84 are arranged by the speaker 37 and ear piece 38 which were explained by drawing 1, respectively. As shown in drawing 2, after the voice inputted from the microphone 83 is changed into an electrical signal and changed into a digital signal by A/D converter 85, it is inputted into the signal-processing section 86. The signal-processing section 86 is a circuit block which performs various processings required in order to realize the function as cellular phones, such as a sound signal processing circuit.

[0038] The sound signal changed into the necessary format in the signal-processing section 86 is sent to the transceiver module 88 through a bus 87. The transceiver module 88 includes the circuit which changes the received electric wave into a sound signal while changing and sending out a sound signal to the electric wave for transmission. The sound signal which received waves in the transceiver module 88 is sent to the signal-processing section 86. After the sound signal

which passed through necessary processing in the signal-processing section 86 is changed into an analog signal through D/A converter 89, it is outputted to a loudspeaker 84.

[0039] Moreover, the portable telephone 30 is equipped with the memory 90 used for the temporary storage list of various data as a storage region of registration information, such as a processing field of various operations, and an address book, etc., ROM91 in which data and a program required for the operation which CPU82 carries out are stored, the liquid crystal display 34, the LCD controller 93 which performs the display control of a liquid crystal display 34, and the control unit 94 which performs various inputs. In addition, it is the block which includes the actuation means of cross-joint carbon button [which was explained by drawing 1] 35, and manual operation button 36, and others in a control unit 94.

[0040] As for the memory 90 in the portable telephone 30 shown in drawing 2 , an usable field (cache buffer field) is changed according to operating conditions, such as a use situation of a portable telephone 30, and the registration number of cases. CPU82 manages the operating condition of memory 90, and grasps a capacity (henceforth the capacity of a built-in buffer) usable as a buffer. Moreover, CPU82 performs data communication control etc. in a message control list according to the input from a control unit 94. The LCD controller 93 controls the contents of a display of a liquid crystal display 34 according to the command of CPU82.

[0041] Next, actuation of the system which consists of the digital camera 10 and portable telephone 30 which were constituted is explained like the above. Drawing 3 is the conceptual diagram showing actuation of this system. When transmitting the image photoed with the digital camera 10 to a portable telephone 30 and making it display with the liquid crystal display 34 of a portable telephone 30, a portable telephone 30 and a digital camera 10 perform the negotiation by communication link mutually first. In a negotiation, the image size (display size of a liquid crystal display 34) which can be displayed, a graphics format, and the information about the capacity of built-in buffer 90A are exchanged in a portable telephone 30 besides the decision of transmission speed, and the transceiver check of data.

[0042] A digital camera 10 acquires these information and measures the file size of an image file 96 and the capacity of built-in buffer 90A which should be transmitted. When the file size of the image file 96 specified as a candidate for a transfer is over the capacity of built-in buffer 90A, image transformation which makes a file size small, such as repressing by changing a compression parameter, is performed, and the image (it is called the data for transmission.) 97 of the amount of data of the range which does not exceed the capacity of built-in buffer 90A is generated. It is not limited to a JPEG format but the data 97 for transmission are BMP, A format and PNG It may be changed into the format of a format and others.

[0043] In this way, by serial communication etc., the generated data 97 for transmission are transmitted to a portable telephone 30 side, and are stored in built-in buffer 90A in a portable telephone 30. The contents of an image are displayed with the liquid crystal display 34 of a portable telephone 30 after transfer termination of an image. It not only displays the image data stored in built-in buffer 90A on a liquid crystal display 34, but it can send it to a desired partner through communication networks, such as the Internet, by the electronic mail function of a portable telephone 30. Moreover, it is also possible to transmit the data in built-in buffer 90A to other external instruments by connecting with a portable telephone 30 external instruments, such as PDA which is not illustrated. In addition, the data transmitted from the digital camera 10 may always be put on built-in buffer 90A (cache buffer), and may be moved to secondary memory.

[0044] Drawing 4 is a flow chart which shows the control procedure of a digital camera 10. In displaying on the liquid crystal display 34 of a portable telephone 30 the image photoed with the digital camera 10, it performs the negotiation by communication link between a digital camera 10 and a portable telephone 30 first (steps S110-S116). That is, a digital camera 10 determines transmission speed between the portable telephones 30 connected (step S110), and acquires the information on the image size which can be displayed with a portable telephone 30 (step S112). Next, a digital camera 10 acquires the information on the capacity (SIZE (1)) of built-in buffer 90A while acquiring the format information on the image which can be dealt with with a portable telephone 30 (step S114) (step S116).

[0045] Then, the data of a transfer image are created (step S118). Subsequently, the file size (SIZE (2)) of a transfer image and the capacity (SIZE (1)) of built-in buffer 90A are measured (step S120). When the file size is over the capacity of built-in buffer 90A as a result of the comparison (in the case of SIZE(1) <SIZE (2)), transform processing which makes return and a file size small is carried out to step S118, and re-creation of image data is performed. In the digital camera 10 of this example, by changing a quantization table and the Huffman table to the image for a transfer, compressibility is adjusted automatically and it changes into the data of a file size acceptable by the portable telephone 30 side. By changing compressibility, file capacity is changeable also in the same image size.

[0046] In step S120, when a file size obtains the judgment below the capacity of built-in buffer 90A (SIZE(1) >=SIZE (2)), processing which transmits the created image concerned by communication link is carried out (step S122), and this sequence is ended.

[0047] Thus, since it was made to change the amount of data of the image which should be transmitted according to the amount of data demanded from a portable telephone 30, the specified file can surely be perused with a portable telephone 30. When there is much capacity of usable built-in buffer 90A, it is possible to transmit a high definition image and to display in the liquid crystal display 34 of a portable telephone 30, even if it is a case with little capacity of usable built-in buffer 90A, the amount of data can be controlled suitably, an image can surely be transmitted, and the check of the contents of an image is possible according to this operation gestalt, at a portable telephone 30 side.

[0048] In the above-mentioned explanation, in case compressibility is changed so that it may become the amount of data corresponding to the capacity of built-in buffer 90A, compressibility is determined that it will become the highest possible image quality. Thereby, improvement in display image quality is expectable. In addition, the configuration as which it is not necessary to necessarily make it high definition as much as possible on the occasion of operation of this invention, and a user is made to choose compressibility is also possible.

[0049] moreover, the voice which replaces not only with modification of a compression parameter but with this, or uses together with this, and reduces image size, such as carrying out (resizing) or reducing color information (subtractive color processing), -- it is also possible to change a file size therefore like. For example, when the liquid crystal display 34 of the portable telephone 30 besides the mode which resizes according to the display capacity of a portable telephone 30 does not support color display (in the case of a monochrome type display), there is also a mode of transmitting after changing a color picture into monochrome image and reducing the amount of data.

[0050] Although the above-mentioned operation gestalt described the example which records a still picture and transmits the still picture file to a portable telephone 30 with a digital camera 10, the applicability of this invention is not limited to this. The mode which adds at least one function among the functions (audio regenerative function) which reproduce music files, such as a function (animation photography function) which replaces with still picture record in a digital camera 10, or combines with this, and records an animation with voice, a function (voice recorder ability) which records only voice, without carrying out photography, and MP3 (MPEG-1 Audio Layer-III), is also possible.

[0051] Drawing 5 is the block diagram of the digital camera with which an animation photography function, voice recorder ability, and an audio regenerative function were added. The same sign is given to a part the same as that of the digital camera 10 shown in drawing 2 in the said drawing, or similar, and the explanation is omitted.

[0052] The digital camera 100 shown in drawing 3 is equipped with a loudspeaker 104 also as the microphone 102 and voice output means as a voice input means, and the signal-processing section 57 includes a sound signal processing circuit. The compression elongation circuit 64 is made to serve a double purpose as a circuit which performs compression and elongation of not only a still picture but an animation and voice data. After the voice inputted from the microphone 102 is changed into an electrical signal and changed into a digital signal by A/D converter 106, it is inputted into the signal-processing section 57. The signal-processing section 57 changes voice data into a predetermined signal format. Voice data is changed into a predetermined file

format (for example, WAVE format) if needed, and is recorded on an archive medium 66 through the media interface 65.

[0053] Moreover, elongation processing is carried out if needed and the voice data read from the archive medium 66 is sent to the signal-processing section 57. And a loudspeaker 104 is supplied, after it is decoded in the signal-processing section 57 and changed into an analog signal by D/A converter 108. In this way, it is outputted as voice from a loudspeaker 104.

[0054] The mode circuit changing switch 13 contained in a control unit 67 is an actuation means which changes alternatively.still picture photography mode, a playback mode, the movie mode in which animation photography with voice is performed, and the voice recorder mode in which voice record without an image is performed. A shutter release 12 is made to serve a double purpose also as a start/a stop button of the sound recording in voice recorder mode while being used as a start/a stop button of an image transcription in movie mode.

[0055] If movie mode is chosen with the mode circuit changing switch 13, the animation record with voice will be attained. If image transcription actuation starts and the depression (S1=ON) of the shutter release 12 is carried out once again by the depression (S2=ON) of a shutter release 12, image transcription actuation will stop. Thereby, the actuation sound of a shutter release 12 is recorded. The period and image transcription actuation which are carrying out depression continuation of the shutter release 12 may be performed, and an image transcription may be suspended by depression discharge. It is set beforehand, for example, the movie with voice (8kHz, 8 bits, monophonic recording) for the longest about 160 seconds can be photoed by one photography, and the longest time amount recordable by one photography, image size, a frame rate, a recording method, etc. are 320x240, It is recorded on an archive medium 66 by a pixel, 10 frames per second, and the Motion-JPEG format. Voice record will be attained if voice recorder mode is chosen with the mode circuit changing switch 13. Sound recording is started by all push of a shutter release 12 (S2=ON), and sound recording is suspended by the half-push of a shutter release 12 (S1=ON) after that. After the speech information inputted through the microphone 102 is changed into a predetermined file format (for example, WAVE format) in the signal-processing section 57, it is recorded on an archive medium 66 through the media interface 65.

[0056] If audio mode is chosen with the mode circuit changing switch 13, music files, such as an MP3 format stored in the archive medium 66, are reproducible. The music file shall be downloaded in an archive medium 66 through the direct or communication link interface 71 from the personal computer, the music distribution terminal, etc.

[0057] A push on playback/earth switch of the remote control control unit which is not illustrated where a digital camera 100 is set as audio mode reads a music file from an archive medium 66 through the media interface 65. The compressed data of the read music file is elongated by incompressible music data through the compression elongation circuit 64. This elongated music data is outputted as voice through a loudspeaker 104 or the headphone which is not illustrated, after being changed into a sound signal in the signal-processing section 57.

[0058] Each various file of the still picture stored in the archive medium 66 of the digital camera 100 shown in drawing 5 , an animation with voice, voice, and music can serve as a candidate for a transfer. In transmitting an animation file to a portable telephone 30, according to the capacity of built-in buffer 90A of a portable telephone 30, it carries out adjustable [of the compressibility of an animation file]. Moreover, it is also possible to transmit only some frames in an animation file. For example, the processing (equal infanticide or unequal infanticide) which thins out the frame in an animation, the processing which cuts down some animations, and the frame which carries out the automatic judging of the existence of voice record, and does not have voice record are deleted, and there is a mode which reduces the amount of data by processing which extracts only a part with voice record. Of course, it is also possible to transmit the specific frame in an animation as a still picture. Although animation reappearance equivalent to the original animation cannot be performed by having controlled the amount of data to transmit, also in the portable telephone 30 of the destination, grasp of the contents of an image is possible.

[0059] Although a Motion-JPEG format is an animation record format of enumerating the images of each screen as an independent JPEG image, a record format may not be limited to this and the format format of an MPEG method and others is sufficient as it.

[0060] In the algorithm of MPEG, it has the GOP (Group of Pictures) structure which made the bundle how many sheets of those screen data. By MPEG, in order to realize bidirectional prediction, three types called I picture, P picture, and B picture are specified in the image. I picture is Intra. For a coded image (coded image in a frame), and P picture, a Predictive coded image (inter-frame forward direction predicting-coding image) and B picture are Bidirectoionally predictive. A coded image (bidirectional predicting-coding image) is meant. I picture is a screen generable without the screen information of order. P picture and B picture -- the so-called difference -- it has been information and a screen is generated using the screen information of order.
[0061] In case the animation of an MPEG format is transmitted from a digital camera 10 to a portable telephone 30, P picture and B picture are deleted, a screen is thinned out, and the mode which uses only I picture as transmit data is also considered.
[0062] Also when transmitting the voice data recorded with voice recorder mode, and the music data for audio playback like the case where image data is transmitted, according to the amount of memory of the destination, a bit rate is dropped or there is a mode which changes the amount of data by reducing tone-quality information etc. It enables this to surely incorporate the file specified by a user to a portable telephone 30.
[0063] The technical contents of this invention are applicable also about the electronic equipment which deals with electronic data other than images, such as not only a digital camera but a music regenerative apparatus, and sound recording equipment. The information about capacity, a voice output function, etc. of a built-in buffer is acquired from the external instrument connected possible [a communication link], and the equipment which changes the electronic file for a transfer into the amount of data suitable for the external instrument concerned, and is transmitted can be offered.
[0064]
[Effect of the Invention] According to the digital camera and the data transfer approach of starting this invention, as explained above At least one information is acquired by communication link among the information about the output engine performance of the image output means formed in the information and the external instrument about usable capacity of an internal memory by the side of an external instrument. Since it was made to carry out regulating automatically of the image for a transfer to the optimal amount of data based on the acquired information concerned, it becomes possible to hold the quality of the original image file as much as possible, and to check the contents of an image by the external instrument side.
[0065] According to this invention, it becomes possible to surely transmit the data specified by a user, and the incorrect activity resulting from a transfer mistake can be reduced.

[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The outline block diagram having shown the connection relation between a digital

camera and a portable telephone concerning the operation gestalt of this invention
[Drawing 2] The block diagram showing the internal configuration of the digital camera shown in drawing 1, and a portable telephone
[Drawing 3] The conceptual diagram showing actuation of the system which consists of the digital camera and portable telephone of this example
[Drawing 4] The flow chart which shows the control procedure of the digital camera concerning the operation gestalt of this invention
[Drawing 5] The block diagram of the digital camera concerning other operation gestalten of this invention
[Description of Notations]
a 10,100 -- digital camera, 12 -- shutter release, and 14 -- a liquid crystal display monitor, 18 -- connector area, 30 -- portable telephone, and 34 -- a liquid crystal display, 40 -- cable, 51 -- taking lens, and 53 -- CCD, 57 -- signal-processing section, 60 --CPU, and 61 -- RAM, 64 -- compression elongation circuit, 71 -- communication link interface, and 81 -- a communication link interface, 82 --CPU, 86 -- signal-processing section, and 88 -- a transceiver module, 90 -- memory, and a buffer with built-in 90A--

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[Translation done.]

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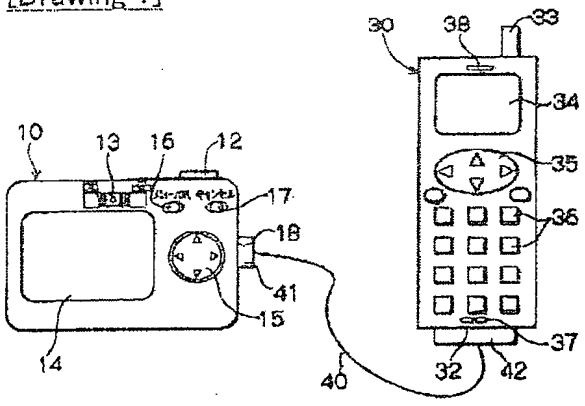
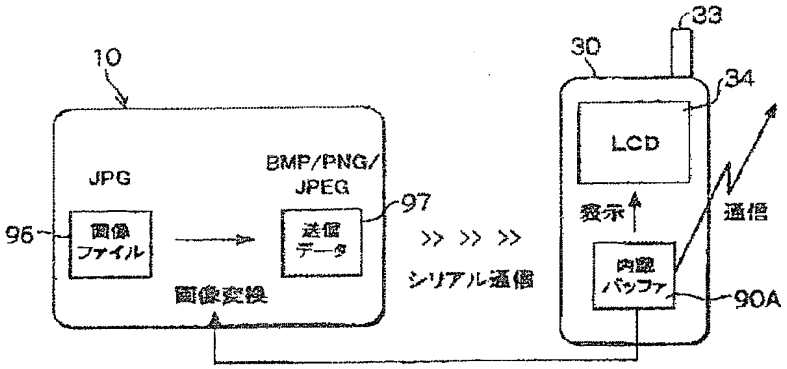
DRAWINGS

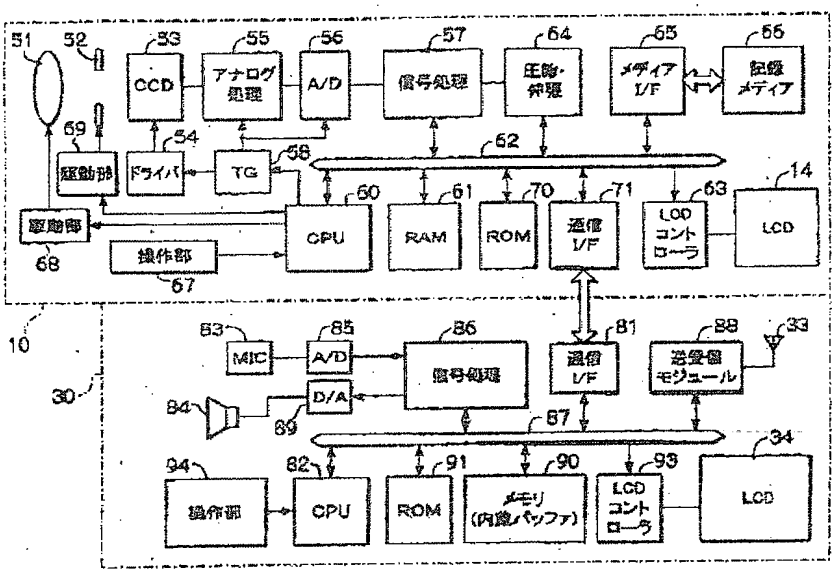
[Drawing 1]



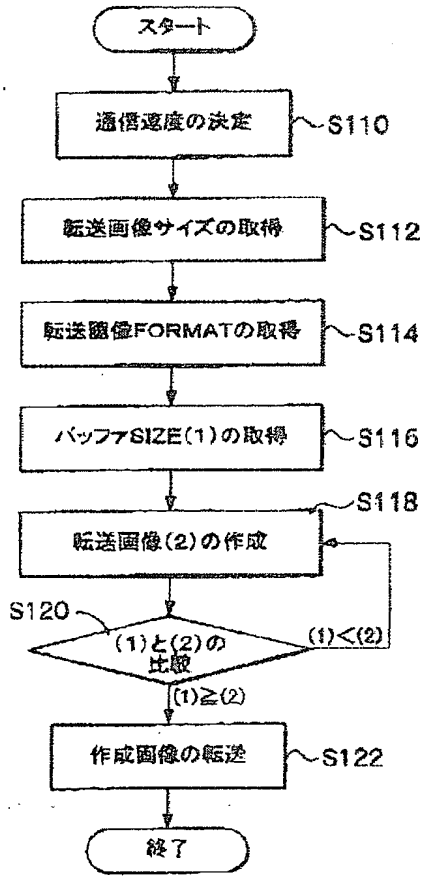
[Drawing 3]



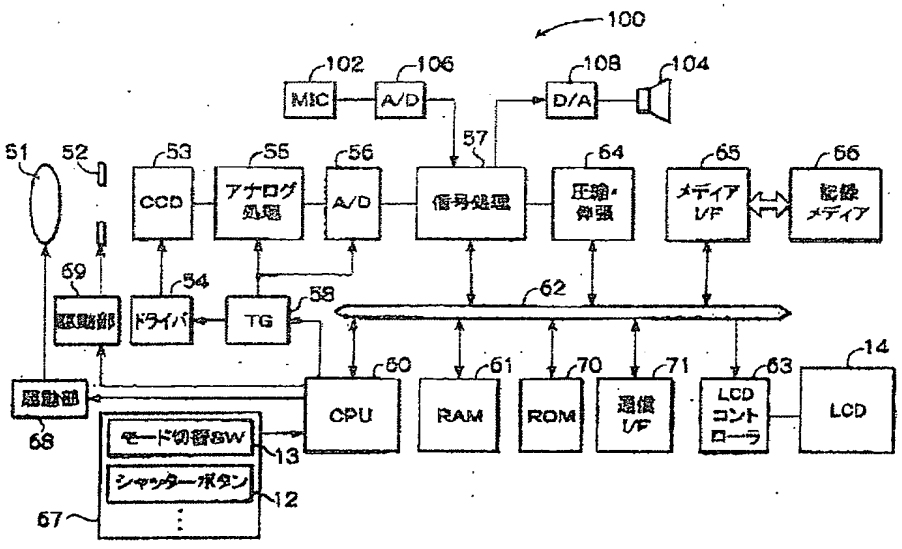
[Drawing 2]



[Drawing 4]



[Drawing 5]



[Translation done.]